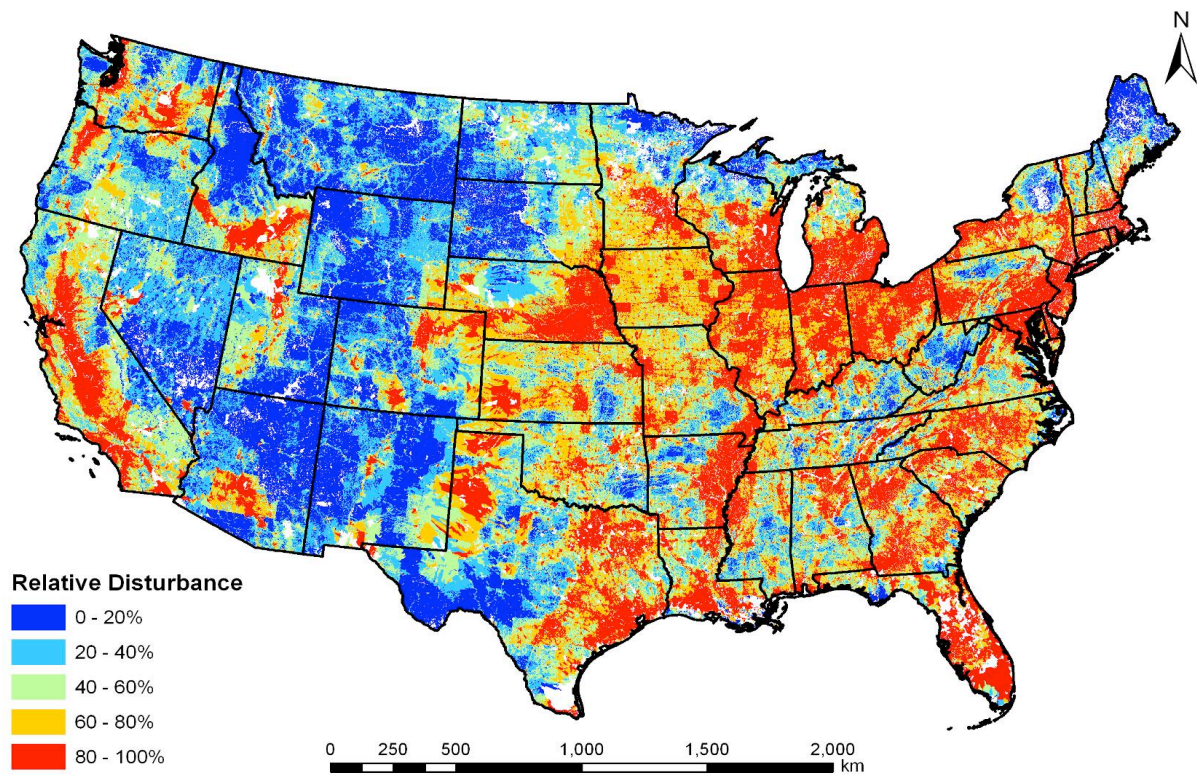


## **Managing the Nation's Fish Habitat at Multiple Spatial Scales in a Rapidly Changing Climate**

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**Summary:** Fisheries and aquatic habitats throughout the United States are in dire need of protection or restoration because human activities have resulted in severe degradation of those habitats. In addition, future climatic changes will continue to affect human land use, temperature, and water flows. Natural resource managers need to identify and prioritize habitats so that limited time and funding can be focused on habitats in most need of protection now and under projected climate changes. This project will use a team of scientists from the USGS, Kansas State University, Michigan State University, Penn State University, University of Minnesota-Duluth, University of Washington, Minnesota Department of Natural Resources, and Michigan Department of Natural Resources to model anticipated changes in fish habitat using downscaled global climate change models to predict alterations of water temperature, hydrology, and land-use under different possible scenarios because there is uncertainty in future projections. This project will work closely with the existing partnership-driven National Fish Habitat Action Plan (NFHAP) to link global climate change models and predicted land-use changes to the Nation's aquatic habitats. The effects of climate change on fish and fish habitat will be conducted at three spatial scales. First, a coarse-scale nationwide assessment of how habitat will change with climate will be conducted. Second, we will use data specific to selected U.S. regions to refine our predicted changes in fish habitat among varying climate and land-use patterns in the Desert Southwest, Rocky Mountain West, Northern Glacial Lakes, and Northeast U.S., and different aquatic systems such as warmwater rivers, glacial lakes, coldwater streams. Finally, we will also determine how selected fish distributions may change with altered climate. For example, the coldwater habitat needed for cisco in lakes in the Upper Midwest is diminishing and may affect the distribution of this critical species. We will provide state and federal agencies, non government organizations, and other stakeholder's with GIS-based maps at national and regional scales showing how habitat will change with climate and land-use change, and information on how those changes affect fish populations. A final report synthesizing this large effort will be produced and distributed to all interested stakeholders, and we will also provide peer-reviewed publications to the scientific community. In addition, the project will train at least five PhD students and post doctoral researchers so these students can continue in their professional careers helping resource managers with the effects of climate change. The project leverages over \$ 1 million in current partnership-driven nationwide and regional fish habitat assessments through the 300-member NFHAP. The results from this study will allow agencies to assess risks and determine how they will manage fish habitat and fish communities in a changing climate.



The map of the current relative condition of the nation's fish habitat, with red areas considered the most degraded. The study will determine how fish habitat changes with climate change at the nationwide scale, but also regional scales and even selected fish populations. Image courtesy of Dr. Dana Infante and Dr. Lizhu Wang.